

REMARKS

Claims 1, 3-6, 8-20 and 24-27 are pending in the application. Favorable reconsideration of the application is respectfully requested.

I. Application Status

Applicants wish to point out that during prosecution of the present application, eight Office Actions have been issued and two Requests for Continued Examination have been filed. In view of the prolonged prosecution history, it is respectfully requested that if further issues arise, the Examiner telephone the undersigned prior to issuing another Office Action so as to avoid prolonging prosecution of this application.

Further, in view of the lengthy prosecution, the Examiner should have a good understanding of the prior art as well as the claimed subject matter and, therefore, it is believed that the above request will not place any undue burden on the Examiner.

II. REJECTION OF CLAIMS 1, 3-6, 8-10, 15-17, 19, 20 AND 24-27 UNDER 35 USC §103(a)

Claims 1, 3-6, 8-10, 15-17, 19, 20 and 24-27 stand rejected under 35 USC §103(a) based on *Acosta et al.* (EP 0996028A2) in view of *Nonaka et al.* (US 6,897,918). Withdrawal of the rejection is respectfully requested for at least the following reasons.

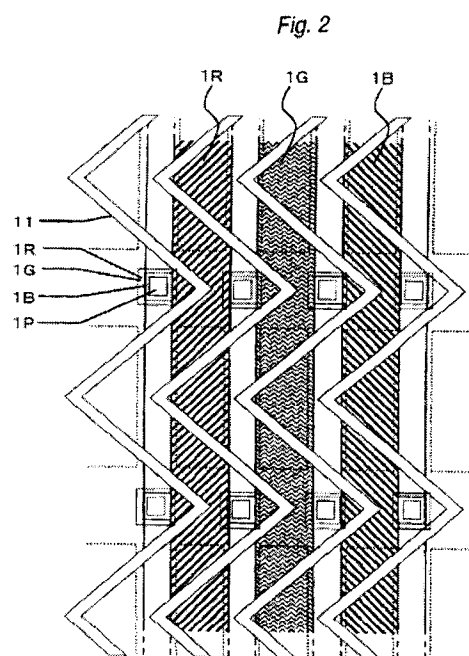
Claim 1 recites a liquid crystal device that includes an alignment layer provided with a plurality of surface protrusions formed from an anisotropic material, wherein the liquid crystal is divided into a plurality of pixels each having an active region, and the active region of each said pixel partially overlaps with at least one of said protrusions. The Examiner admits that *Acosta* does not teach several features of claim 1, including that the active region of each pixel partially overlaps with at least one of said protrusions.¹ The Examiner then states that *Nonaka* teaches a liquid crystal device that includes a plurality of protrusions for controlling liquid crystal alignment, spacers for

¹ See page 3 of the Office Action

fixing the cell gap, and wherein the protrusions have a height that is about 50% to 66% of the height of the spacers. However, the Examiner fails to indicate where *Nonaka* teaches the active region of each said pixel partially overlaps with at least one of said protrusions.

Accordingly, the Examiner has failed to show how the references teach or suggest all the features of claim 1. Moreover, even if *Nonaka* is shown to teach that the active region of each pixel partially overlaps the at last one protrusion, the Examiner has failed to establish a *prima facie* case of obviousness as discussed below.

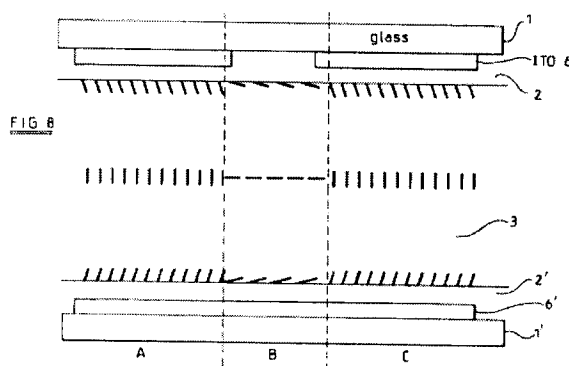
The invention of *Nonaka* relates to a color filter having a protrusion for controlling liquid crystal alignment and a fixed spacer (see col. 1, lines 5-7 of *Nonaka*). In particular, the objective of *Nonaka* is to provide a color filter for a multi-domain vertical alignment (MVA) liquid crystal display device having excellent display qualities and a wide viewing angle (col. 2, lines 40-42 of *Nonaka*). For example, and as shown in Fig. 2 of *Nonaka* (reproduced at right), ITO transparent electrodes are formed on a black matrix and pixels (1R, 1G and 1B). Further, to divide the pixels, polygonal protrusions 11 trapezoidal in section are formed (see col. 13, Ins. 55-61 of *Nonaka*).



Nonaka discloses various shapes that are suitable for the protrusions, and specifically, the shape of the protrusions must be such that the liquid crystal molecules on the pixels can be aligned divisionally in two or more directions. For example, if the protrusion is in the shape of a regular pyramid, the liquid crystal can be aligned divisionally in four directions (see col. 9, ln. 66-col. 10, ln. 19 of *Nonaka*).

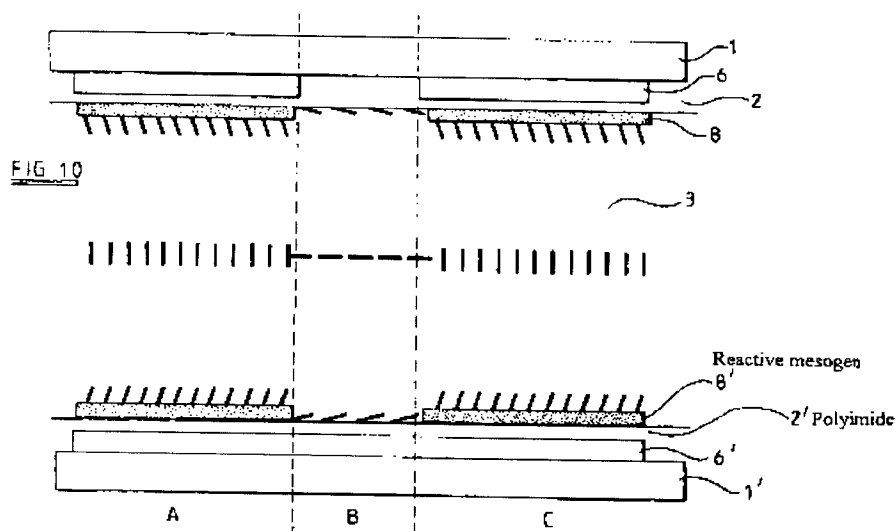
In contrast, the invention disclosed by Acosta is particularly directed to pi-cell device (as shown in Fig. 4a) or a splay-bend device (SBD) (as shown in Fig. 4b). For example, and with reference to Fig. 8

(reproduced at right), Acosta discloses an SBD device with upper and lower substrates (1, 1') each provided with an alignment layer (2, 2'), and liquid crystal layer 3 is provided between the substrates (1, 1'). In particular, both the upper and lower alignment layers (2, 2') have a low-pre-tilt in region B, and a



high pre-tilt in regions A and C. Therefore, when no voltage is applied across the liquid crystal layer 3, an H-state is stable in region B and a V-state is stable in regions A and C as shown in Fig. 8. On the other hand, when operating voltage is applied, the H-state grows out from region B into regions A and C (see col. 13, Ins. 22-36 of Acosta). However, to produce the device as shown in Fig. 8, it would be necessary for the alignment layers (2, 2') to be selectively rubbed to create regions of high pre-tilt and regions of low pre-tilt.

Instead of selectively rubbing the alignment layers (2, 2') as shown in Fig. 8, high pre-tilt regions A and C can also be produced by disposing reactive mesogen layers (8, 8') onto alignment layers (2, 2') so that V-state is stable in regions A and C when no voltage is applied, as shown in Fig. 10 (reproduced at right) (see col. 13, ln. 44-col. 14, ln. 21 of Acosta).



Therefore, the reactive mesogen layers (8, 8') as disclosed by *Acosta* are provided to create high pre-tilt regions so that V-state is stable, for example, in regions A and C as shown in Fig. 10, when no voltage is applied (see col. 13, Ins. 56-67 and col. 14, Ins. 15-16 of *Acosta*).

The Examiner alleges that *Acosta*'s reactive mesogen layers (8, 8') as shown in Fig. 10 are protrusions, and *Nonaka*'s protrusions 11 can have a height of about 50% to 66% of the thickness of the liquid crystal. The Examiner also alleges it would have been obvious to modify *Acosta*'s reactive mesogen layers (8, 8') to a "proper" (i.e., taller) height in order to obtain a sufficient divisional aligning effect and facilitate the manufacturing process.

However, and as discussed above, *Acosta*'s reactive mesogen layers (8, 8') (the alleged "protrusions") are provided to create high pre-tilt regions. In contrast, and as also discussed above, *Nonaka*'s protrusions 11 must be such that the liquid crystal molecules can be aligned divisionally in two or more directions. Therefore, modifying *Acosta*'s reactive mesogen layers (8, 8') with *Nonaka*'s protrusions 11 as proposed by the Examiner would destroy the sole function of the mesogen layers (8, 8'). In other words, the mesogen layers would no longer provide their intended function (i.e., creating high pre-tilt regions A and C as shown in Fig. 10 when no voltage is applied), and the device of *Acosta* would not operate as intended. That is, if *Acosta*'s reactive mesogen layers (8, 8') are modified in accordance with *Nonaka* as alleged by the Examiner, the liquid crystal molecules in each of regions A and C would be aligned divisionally in two or more directions, thereby destroying the reactive mesogen layer's purpose of providing high pre-tilt.

Accordingly, such modification as proposed by the Examiner would destroy the inventive aspect of *Acosta*. That is, the invention of *Acosta* would be unsatisfactorily modified for its intended purpose, and the principle of operation of *Acosta*'s invention would be changed. Therefore, one skilled in the art would not have been motivated to modify *Acosta* in view of *Nonaka* as alleged by the Examiner.

According to section 2143.01(V) of the MPEP, “[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification”. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed Cir. 1984). Moreover, according to section 2143.01(VI) of the MPEP, *the proposed modification cannot change the principle of operation of a reference*. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

References must be considered as a whole, and it is well established that it is impermissible to pick and choose only so much as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly teaches or suggests. *Baush & Lomb, Inc. v. Barnes-Hind/Hydrocurve*, 230 USPQ 416, 419 (Fed. Circ. 1986).

Additionally, it is noted that the protrusion as disclosed in *Acosta* is anisotropic and made of reactive mesogen, which provides an array of liquid crystal. In contrast, the protrusion as disclosed in *Nonaka* is isotropic. Specifically, if an anisotropic protrusion is present in *Nonaka*, this causes a problem the polarization of the liquid crystal display and the display will not function properly.

Thus, the Examiner has not established a *prima facie* case of obviousness and, therefore, the rejection must be withdrawn. Similar comments apply with respect to claim 20.

Accordingly, withdrawal of the rejection of claims 1 and 20 is respectfully requested.

Claims 3-6, 8-10, 15-17, 19 and 24-27 directly or indirectly depend from claim 1 and, therefore can be distinguished from *Acosta* in view of *Nonaka* for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 3-6, 8-10, 15-17, 19 and 24-27 is respectfully requested.

III. REJECTIONS OF CLAIMS 11-14 AND 18 UNDER 35 USC §103(a)

Claims 12-14 stand rejected under 35 USC §103(a) based on *Acosta* in view of *Nonaka*, and further in view of *Funada et al.* (US 4,232,947). Claims 11 and 18 stand rejected under 35 USC §103(a) based on *Acosta* in view of *Nonaka*, and further in view of *Ulrich et al.* (US Withdrawal of these rejections is respectfully requested for at least the following reasons.

Claims 11-14 and 18 each depend from claim 1 either directly or indirectly, and can be distinguished over *Acosta* and *Nonaka* for at least the same reasons. Moreover, neither *Ulrich et al.* nor *Funada et al.* makes up for the above-discussed deficiencies in *Acosta* and *Nonaka*. Thus, withdrawal of the rejections is respectfully requested.

IV. CONCLUSION

Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Application No.: 10/087,660

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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